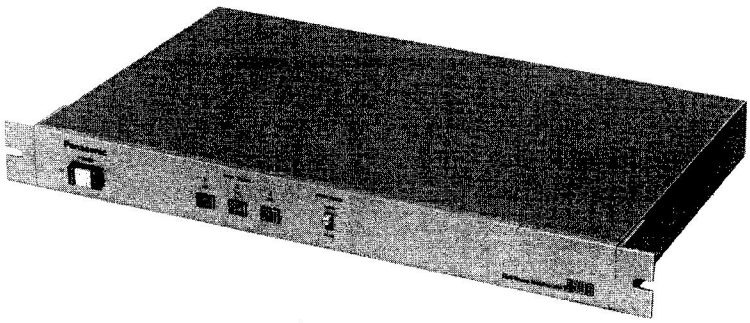
ORDER NO. VRD-8203-063

Service Manual

Multiple Source Switcher

NV-J500



SPECIFICATIONS

Power Source:	100/120/220/240 V AC (Selectable), 60/50 Hz
Power Consumption:	6 W
Connectors	
Input 1:	Dubbing Input Connector (7-pin) Video Input Connector (BNC) Audio Input Jack (RCA pin-jack, CH1/CH2) ON-Line Input Jack (RCA pin-jack)
Input 2 and input 3 connectors are the same as Input 1.	
Output:	Dubbing Output Connector (7-pin) Video Output Connector (BNC × 2) Audio Output Jack (RCA pin-jack, CH1 × 2/CH2 × 2)
Operating Temperature:	41°F – 104°F (5°C – 40°C)
Operating Humidity:	35% to 80%
Weight:	Approx. 8.8 lbs. (4 kg)
Dimensions:	17 "(W) × 2-1/8 "(H) × 10-1/4 "(D) 430(W) × 52(H) × 260(D) mm
Accessories Supplied:	1 pc. AC Power Cord 1 pc. Rack-Mounting Supports

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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INTRODUCTION

This service manual contains the technical information whitch will allows service technicians to understand and service the Panasonic Multiple Source Switcher model NV-J500.
The NV-J500 has many special features as shown below.

FEATURES

- **This multi-source switcher is designed to switch the audio and video signals of source units.** Up to three source units can be connected simultaneously and, by operating the buttons, these signals of the desired source unit can be relayed to the editor unit. This means that two or three connected source units can be started simultaneously and that editing is possible while they are selected by the multi-source switcher. Moreover, dubbing connectors have been provided to safeguard against any deterioration in the picture quality of the edited tape.
- **There are two sets of both video and audio output terminals.** They can be used, for instance, when connection is made with a TV monitor for monitoring the pictures and sound of the selected source unit.
- **Facilities are provided for connection with a 3/4-inch video tape recorder or VHS video recorder.** Any of six video recorders models, including the NV-8500 – AU-700, NV-9600, NV-9240, NV-8200 and NV-8170 – can be used, as the source unit and corresponding connection facilities are provided in the switcher.

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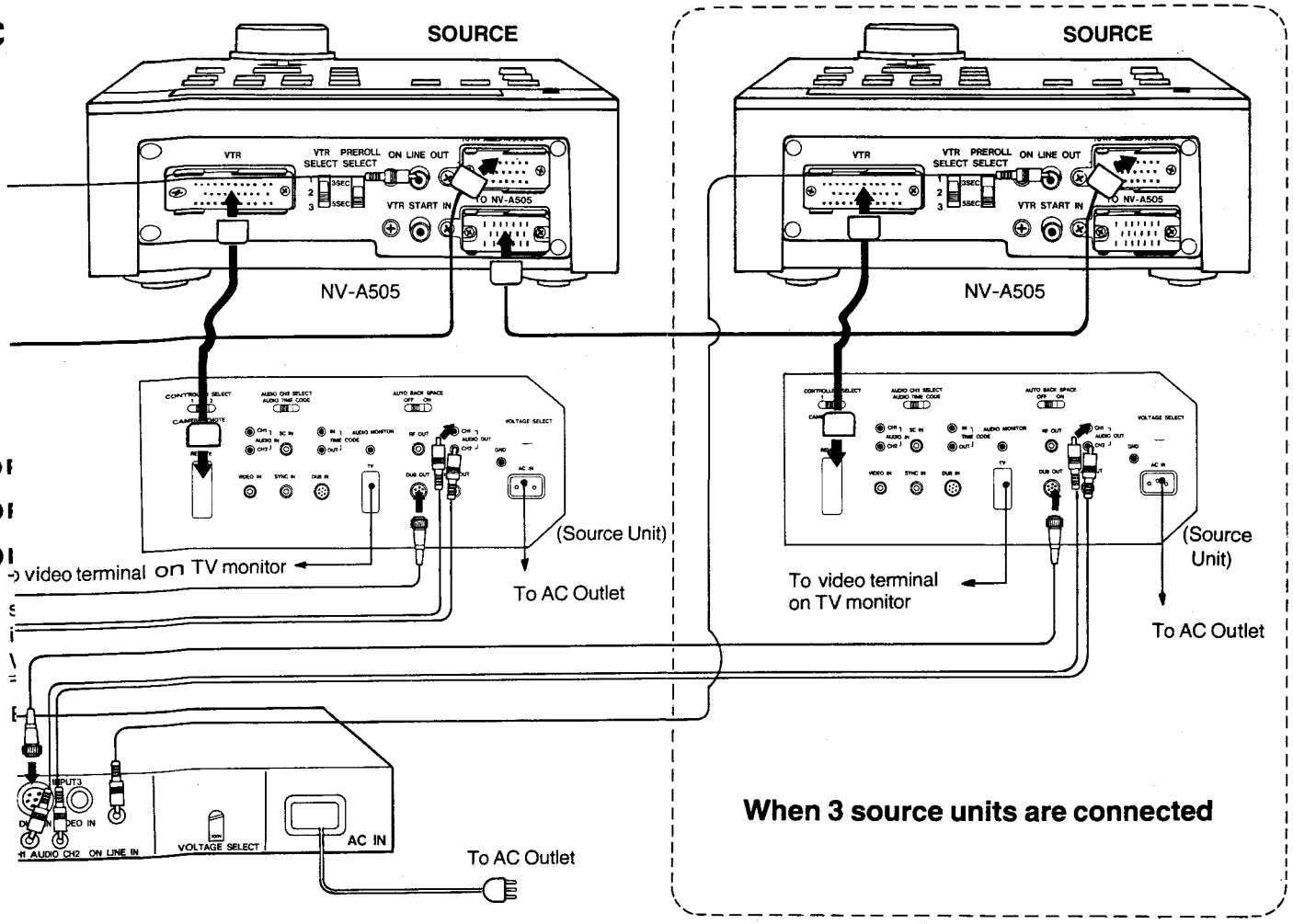
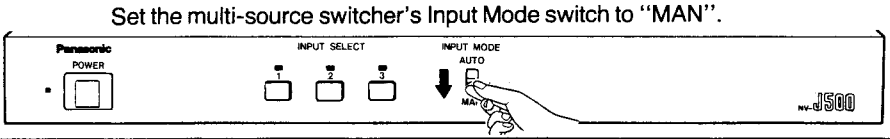


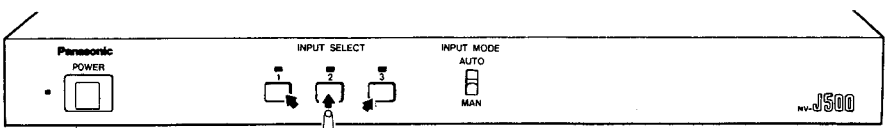
Editing with 2 or 3 source units started simultaneously

Press the ON Line Button on the controller connected to the source units and extinguish all the ON Line Lamps. Press the ON Line Button on the Editor Controller NV-A500 or Remote Search Controller NV-A505 and light up the lamp and then select the source units which are to be started simultaneously.

Set the multi-source switcher's Input Mode switch to "MAN".



Press the multi-source switcher's Input Selector Button to select the source unit to be edited first of all.



Read the Operating Instructions of the Editing Controller NV-A500 for details on editing and search operations using the source units which are to be started simultaneously.

*Use the multi-source switcher's Input Selector Buttons to select the source units.

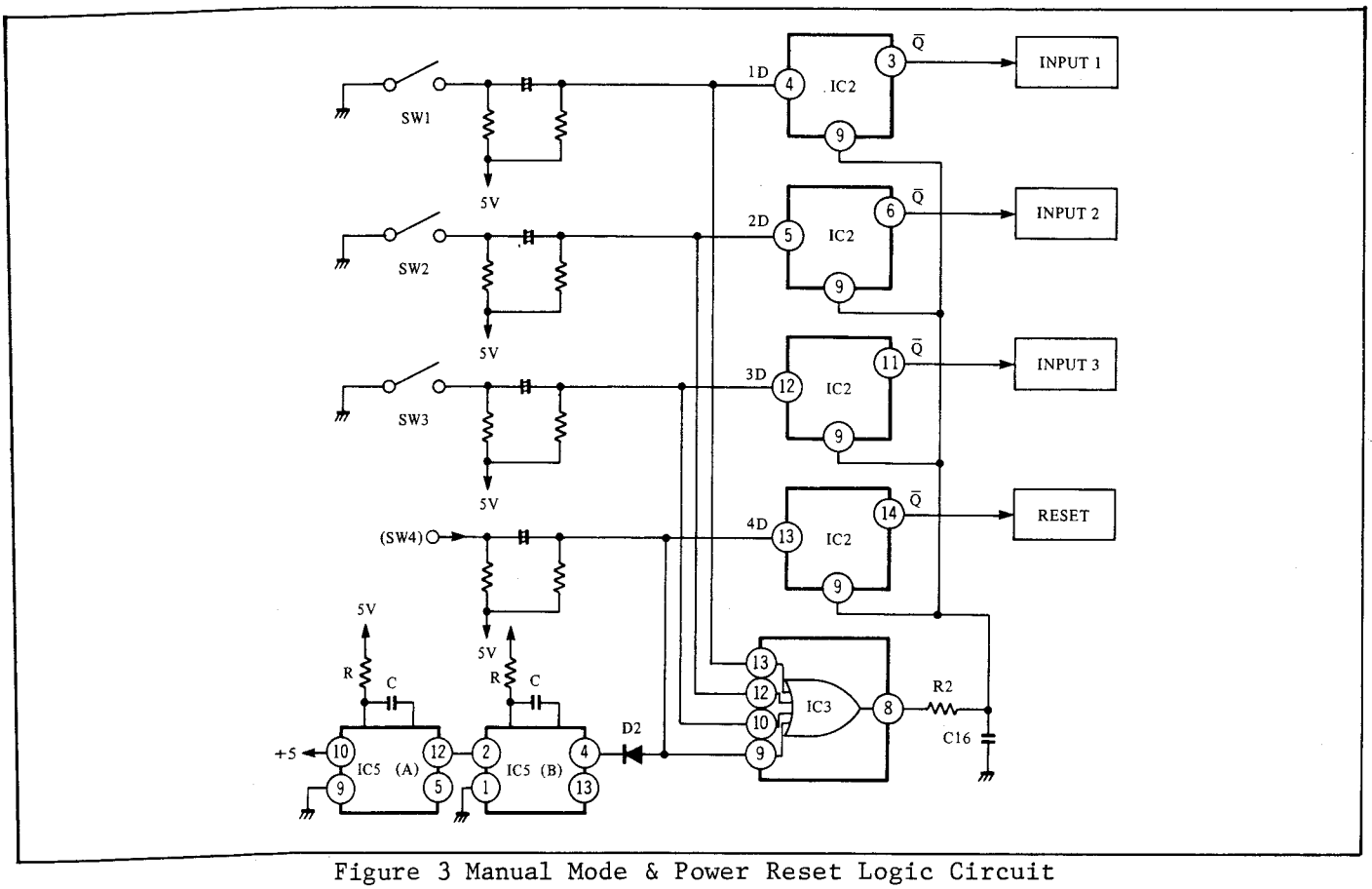


Figure 3 Manual Mode & Power Reset Logic Circuit

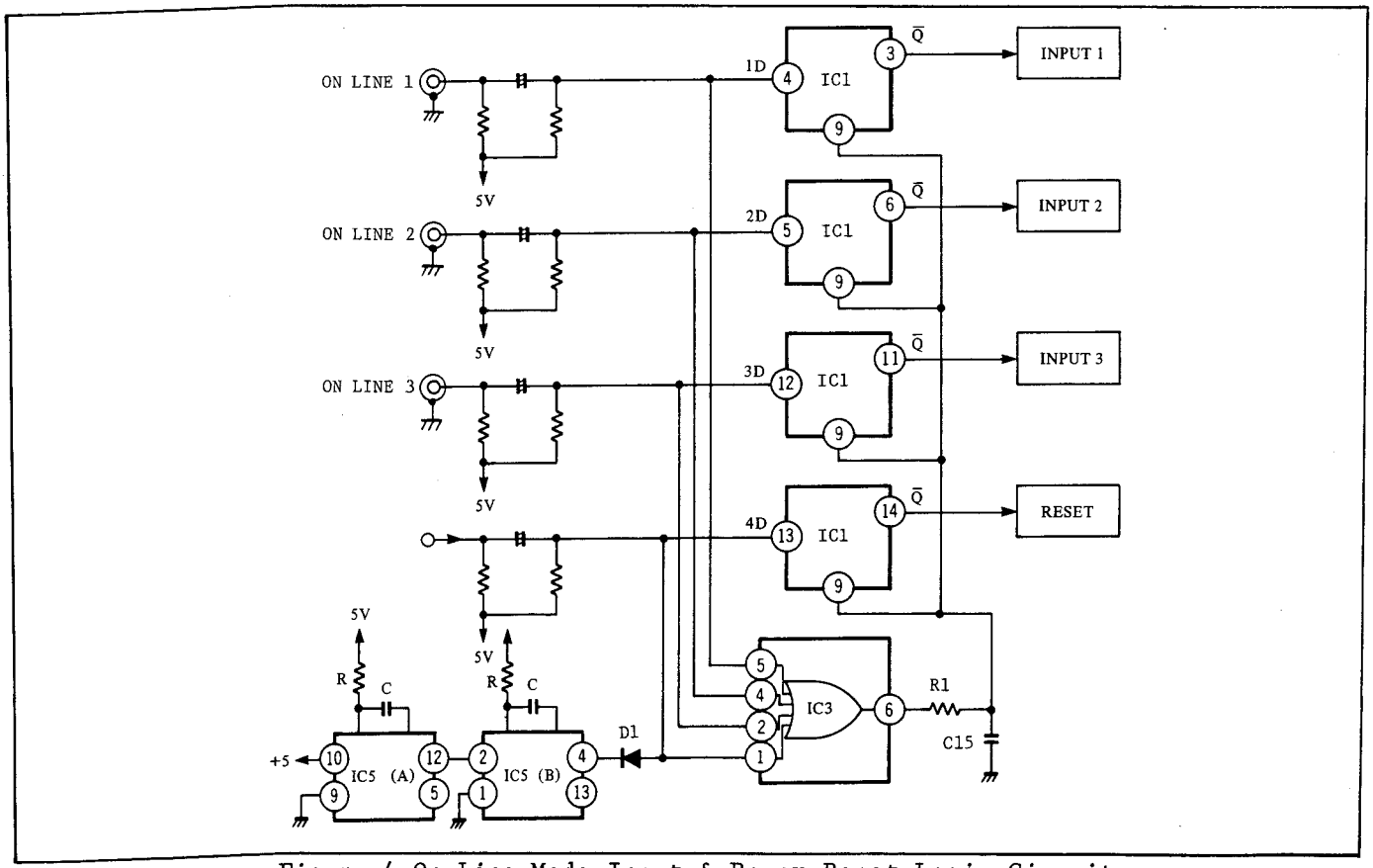


Figure 4 On Line Mode Input & Power Reset Logic Circuit

(B) On-Line Select Logic

As shown in Figure 4, the on-line or automatic inputs function in the same fashion as the manual inputs described above, except the low input comes from the output of the NV-A500 remote control rather than the front panel switches.

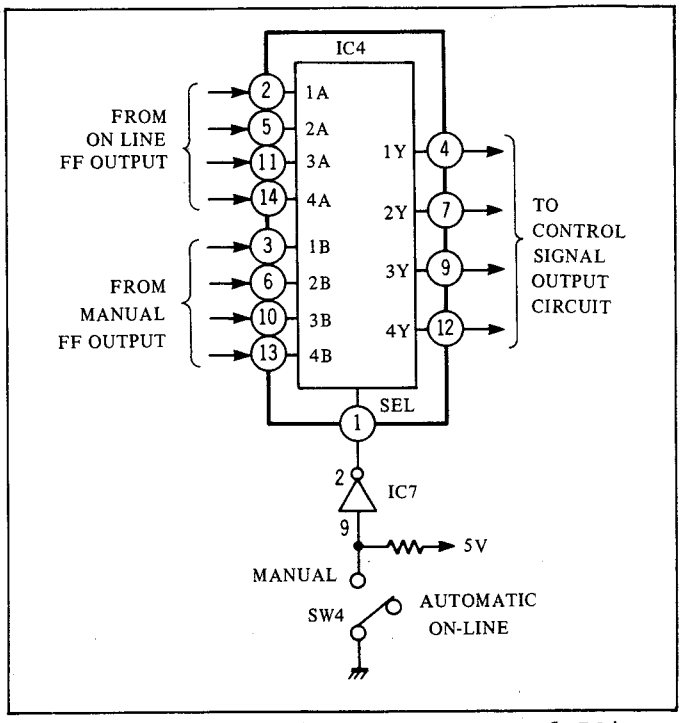


Figure 5 Mode Select Operation of IC4

2. ON-LINE/Manual Mode Switching

The front panel mode select switch (SW4) controls the state (high or low) of IC4 pin 1 through an inverter (IC7). As shown in Figure 5, when pin 1 is low, the on line inputs at the A port appear at the Y output (pins 4, 7, 9, 12).

When pin 1 is high the manual or B inputs appear at the Y output pins.

3. Control Signal Output and Source Display

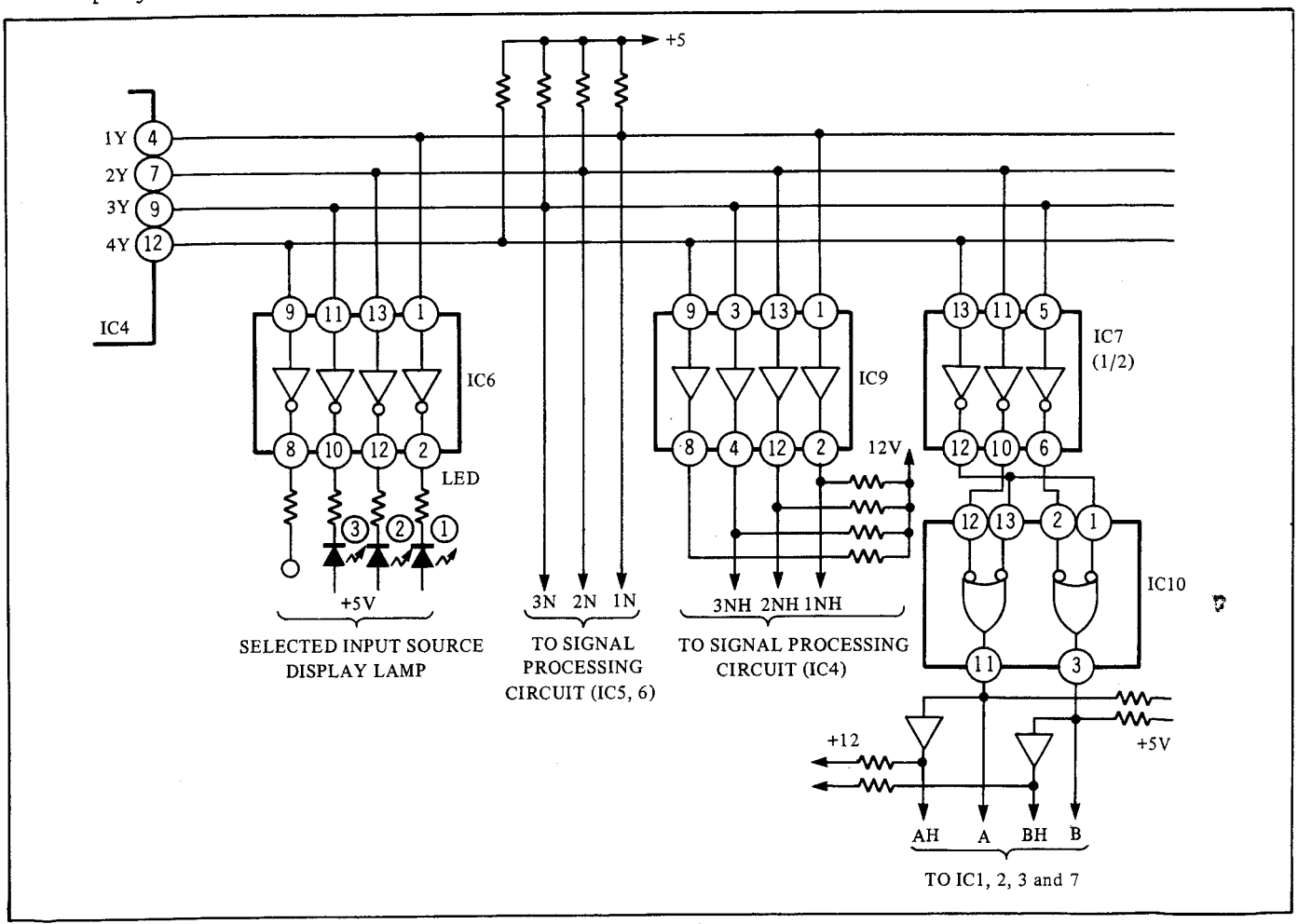


Figure 6 Control Signal Output/Source Display Circuit

(A) Selected Input Source Display Lamp

When a Source is selected, one of the IC4 pins 4, 7, 9, goes High. The appropriate LED cathode goes Low through Inverter IC6, thus enabling LED to light up for the selected source. When the power is reset, IC4 pin 12 goes High, turning all LEDs OFF.

(B) Switching Control Signal (1N, 2N and 3N)

When a Source has been selected by either the On-Line or Manual switches, a High signal appears on the appropriate 1N, 2N or 3N line. These signals are 5 volt logic level, and are sent to the Signal Processing Circuit boards.

(C) Switching Control Signal (1NH, 2NH, and 3NH)

Switching controls signals 1NH, 2NH and 3NH are buffered by IC9, and sent to the Signal Processing Circuit. These signals are shifted to 12 volt logic levels by IC9.

(D) Switching Control Signal (A, B, AH, and BH)

IC7 and IC10 generate signals that control ICs 1, 2, 3, and 7 of the Signal Processing Circuit. Signals from IC4 pins 2Y, 3Y, and 4Y are inverted and applied to the NAND circuit of IC10, as shown in Table 3 below. The output signals A and B are 5 volt logic level, and signals AH and BH are 12 volt logic level.

		RESET	SW2 ON (2Y)	SW3 ON (3Y)	SW1 ON (1Y)	
INPUT	4Y	H	L	L	L	
	2Y	L	H	L	L	
	3Y	L	L	H	L	
OUTPUT	IC10 ⑧ B BH	Ⓗ	Ⓛ	Ⓗ	Ⓛ	4Y ı 3Y
	IC10 ① A AH	Ⓗ	Ⓗ	Ⓛ	Ⓛ	4Y ı 2Y

Table 1 Function of ICs 7 and 10 (Output)

Thus, four sets of signals 1N to 3N, 1NH to 3NH, A and B, and AH and BH are sent to the Signal Switching Circuits.

4. Signal Switching Circuit

As shown in the block diagram (Figure 7), the NV-J500 has three sets of inputs of which one can be selected for the output.

This switching requires six signal paths: 75Ω composite video, two audio channels, a Dub luminance (Dub Y), a Dub Chrominance (Dub C), and a Dub head switching channel. In addition, one control line is returned to the Dub Inputs from the output connector.

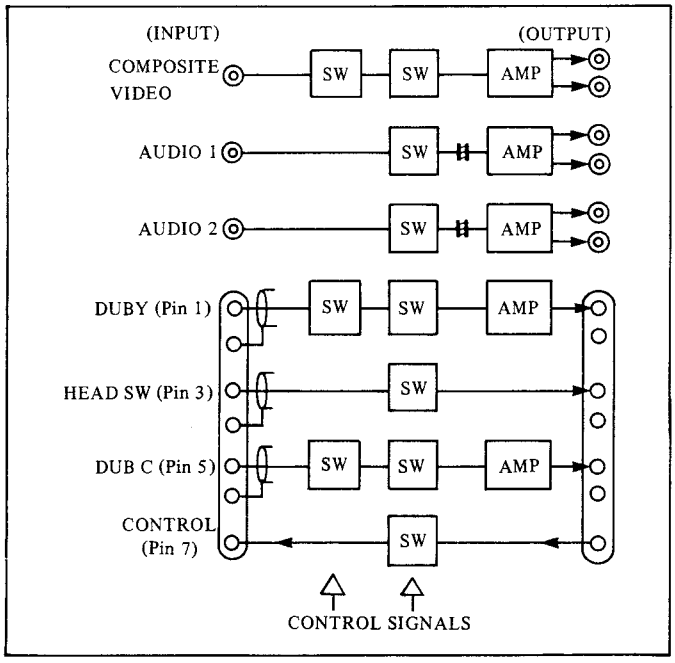


Figure 7 A Block Diagram of the Signal Processing Circuit (One Line System Only)

(A) Switching Devices

In order to understand the switching process, the switching devices must be described. Two versions of a multiple channel analog multiplexer design are used. The type 4052B is a dual 4 channel device, and the type 4053B is a triple 2 channel device. Block Diagrams and Truth Tables for each are shown in Figure 8 and 9.

4052

DUAL 4-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER

TRUTH TABLE

INPUTS			CHANNELS			
$\overline{E}$	A1	A0	Y0-Z	Y1-Z	Y2-Z	Y3-Z
L	L	L	ON	OFF	OFF	OFF
L	L	H	OFF	ON	OFF	OFF
L	H	L	OFF	OFF	ON	OFF
L	H	H	OFF	OFF	OFF	ON
H	X	X	OFF	OFF	OFF	OFF

X=DON'T CARE

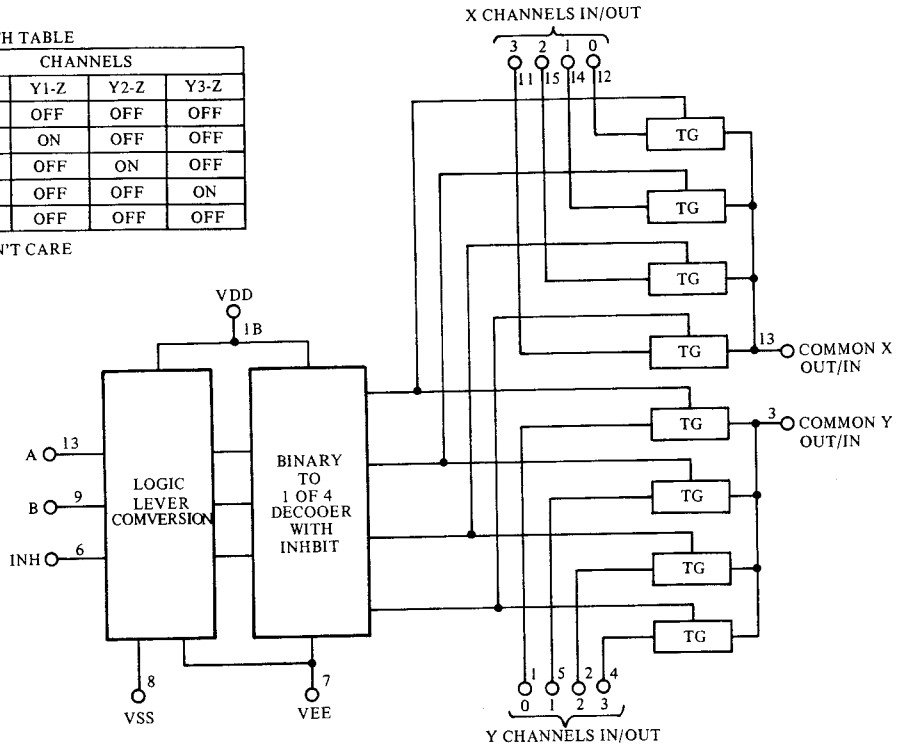
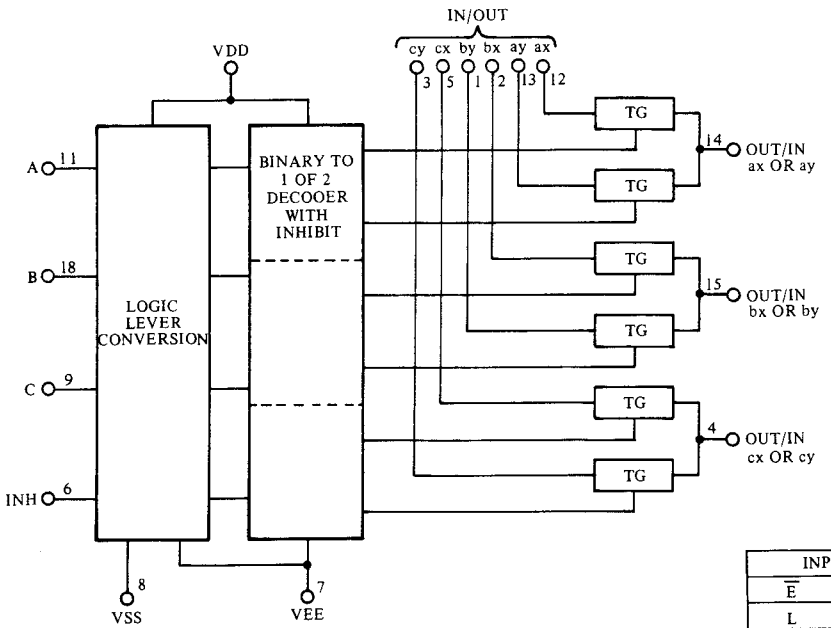


Figure 8 4052 Block Diagram & Truth Table

4053

TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER



TRUTH TABLE

INPUTS		CHANNELS	
$\overline{E}$	S	Y0-Z	Y1-Z
L	L	ON	OFF
L	H	OFF	ON
H	X	OFF	OFF

X=DON'T CARE

Figure 9 4053 Block Diagram & Truth Table

As can be seen from the block diagrams, the switching is done by mos analog switch elements which are normally open (marked TG in the diagrams). These elements are bidirectional, and turned on as required by the on chip logic, through the A, B and (for the 4053) C inputs. These inputs come from the switch logic section described above.

(B) Signal Switch

In order to explain the signal switching circuit, the Dub portion will be described. The Dub luminance (Dub Y) inputs come to IC5, and the Dub chrominance (Dub C) inputs go to IC6. These are 4053 type 3 section switches, and are used for isolation. The inputs are from the logic signals 1NH, 2NH, 3NH.

Therefore, when input two is selected, for example, input Y1, is connected to Y, and X0 and Z0 (Ground) and connected to X and Y. (See Figure 10.)

These X, Y and Z outputs from IC5 and 6 go to IC3. IC3, a 4052 type device, will choose one of four inputs based on control A and B. This control comes from the AH and BH outputs of the logic circuit. At points X and Y of IC3 appear the selected Dub Y and Dub C signal.

The other sections function in the same fashion for composite video, Audio channels one and two, Head Switching and VHS/Umatic control.

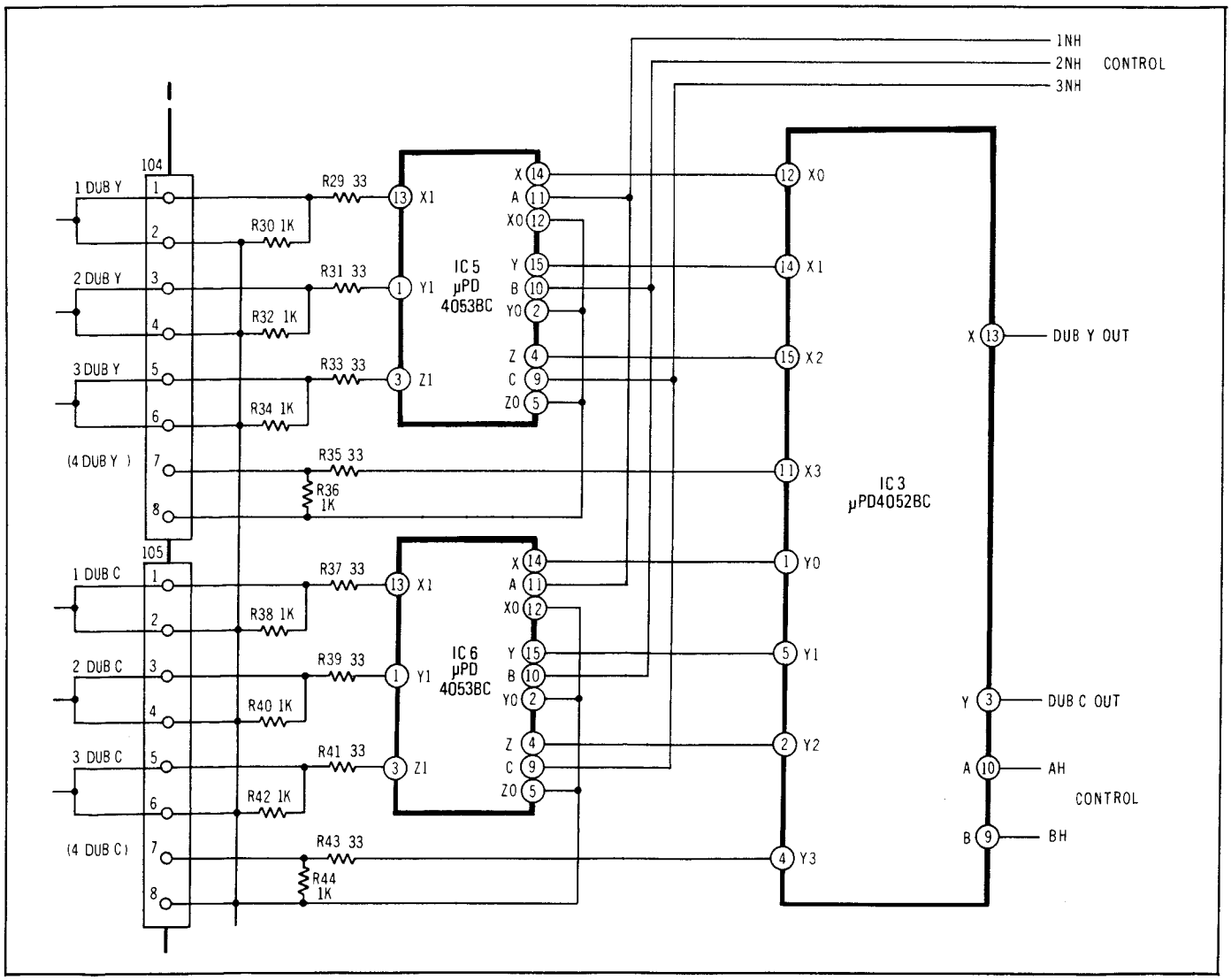


Figure 10 Signal Switching Process

(C) BIAS

It is important to note that the Dub signals travel on a DC bias of about 6 volts. The 4052 and 4053 analog switch elements require that the signal have a D.C. bias of about half the supply voltage in order to pass an analog signal without clipping. For the video and audio sections, the 4052 and 4053 devices (IC1, IC2, IC4) are powered by both +5 and -5 volts, so the analog signal ground is half the supply voltage.

(D) Control Signals

The timing of the control signals used in the description above are shown in Figure 11.

Table 2 and 3 show the state of each switch element in each IC for every control logic level.

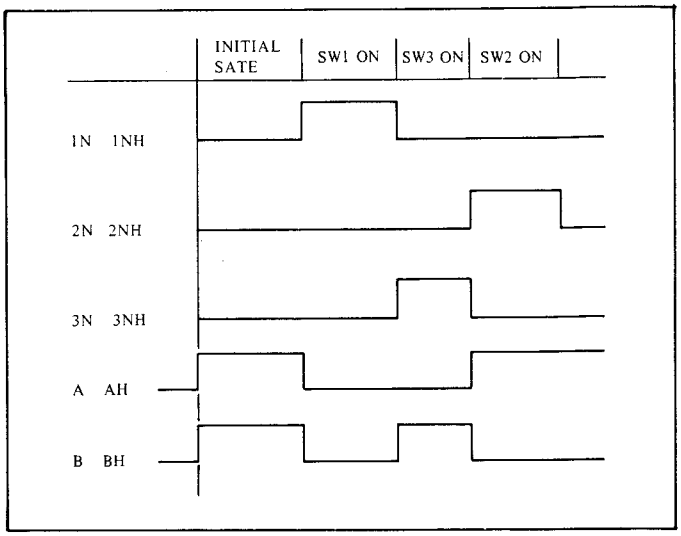


Figure 11 Timing Chart of Control Signals

1N 1NH	2N 3NH	3N 3NH	ON CHANNEL	SOURCE NO.
L	L	L	X0, Y0, Z0	
H	L	L	X1 (1V)	1
L	H	L	Y1 (2V)	2
L	L	H	Z1 (3V)	3

Table 2 Function of ICs 4,5 and 6

A AH	B BH	ON CHANNEL	SOURCE NO.
L	L	Y0 X0	1
H	L	Y1 X1	2
L	H	Y2 X2	3
H	H	Y3 X3	

Table 3 Function of ICs 1,2,3 and 7

5. Signal Amplifiers

The video output siganl is amplified by a unity gain amplifier stage made up of Q1 to Q5. These are shown in Figure 12.

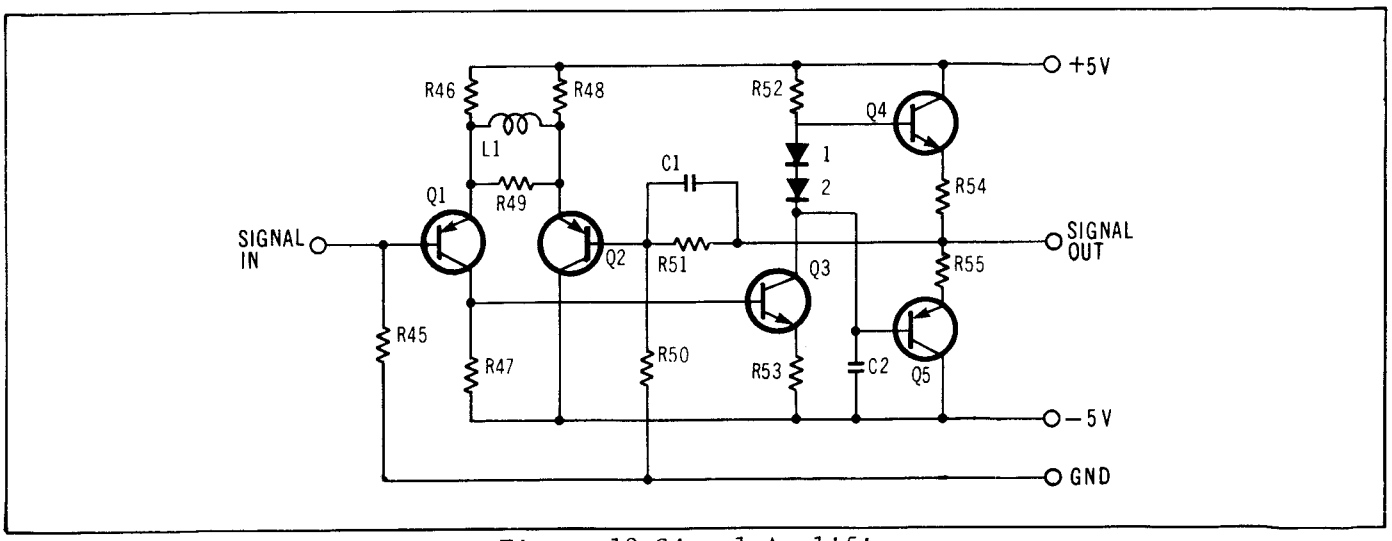


Figure 12 Signal Amplifier

The audio channels are each amplified by a two buffer, Q6, Q7 and Q8, Q9. These are shown in Figure 13.

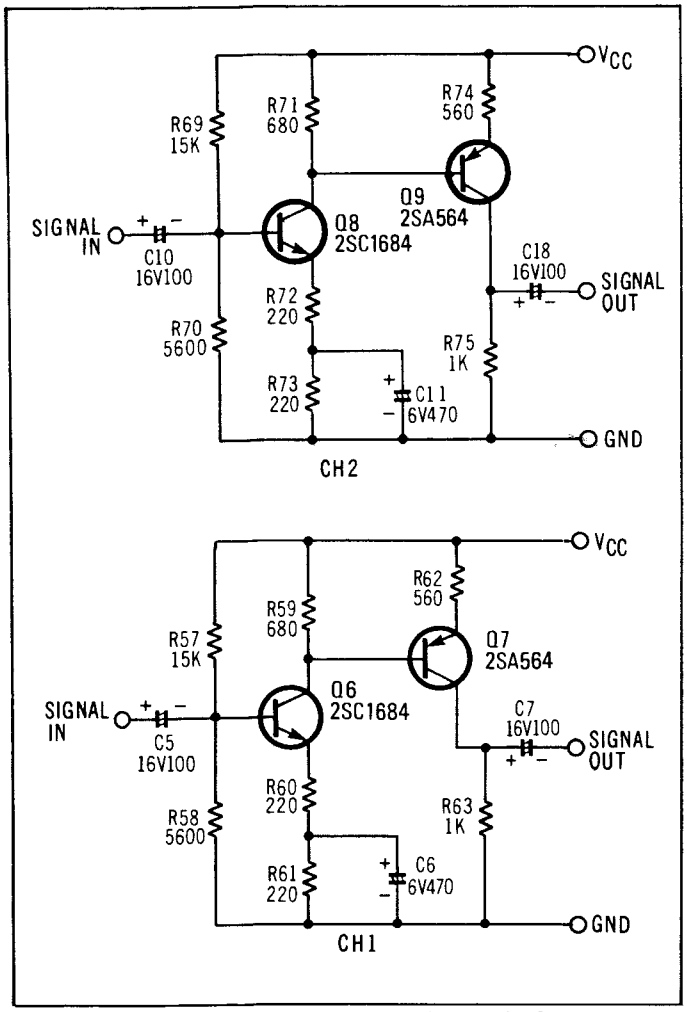
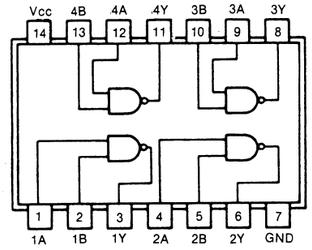
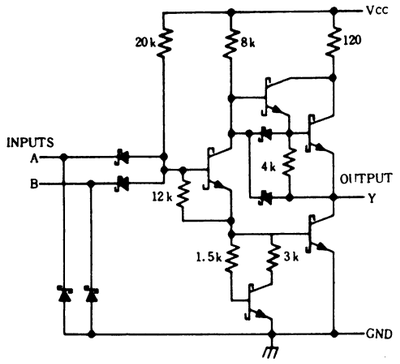


Figure 13 Audio Signal Amplifiers of CH1 & CH2

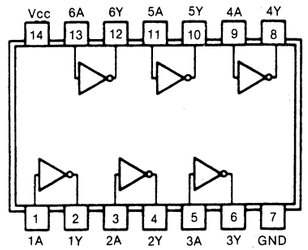
IC INFORMATION

74LS00 Quad 2 Input NAND

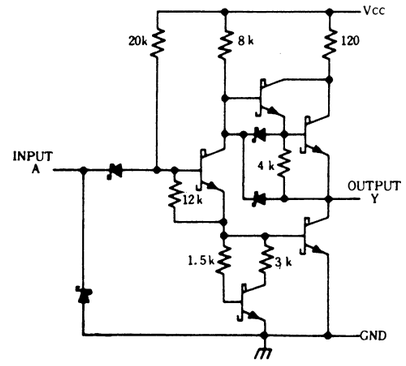




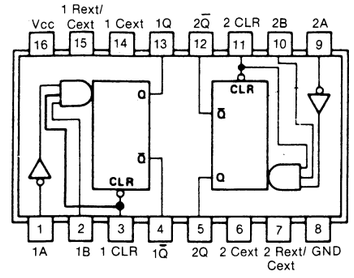
74LS04 Hex Inverters



$OY = \overline{A}$

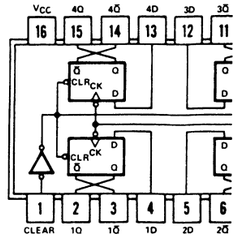


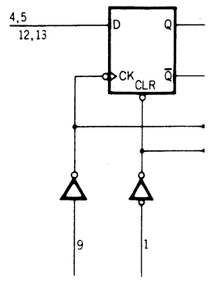
74LS123 Dual Retriggerable Single Shot



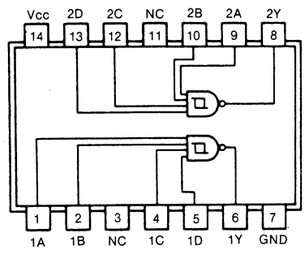
INPUTS			OUTPUTS	
CLEAR	A	B	Q	$\overline{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	⎍	⎎
H	↓	H	⎍	⎎
↑	L	H	⎍	⎎

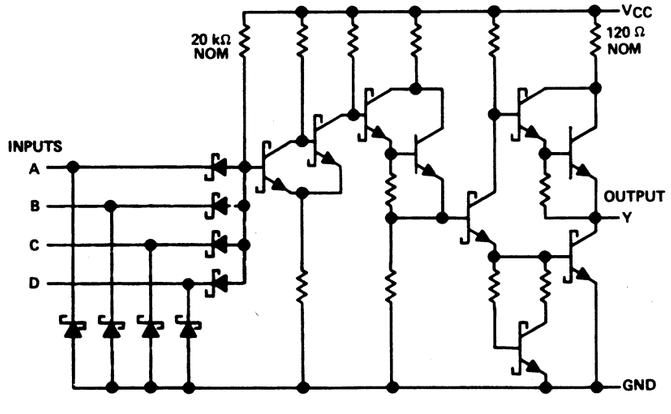
74LS175 Quad D



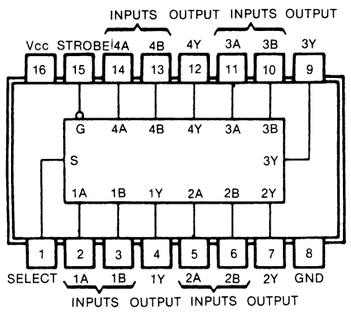


74LS13 Dual 4 Input NAND Schmidt Triggers



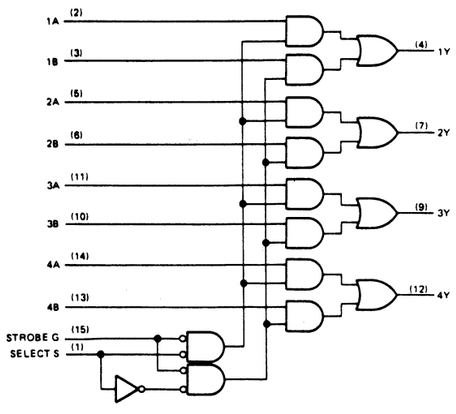


74LS157 2 to 1 Data Selectors

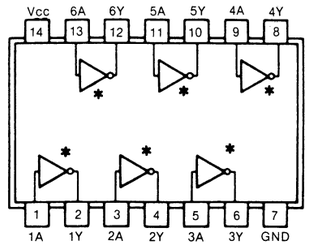

INPUTS OUTPUT INPUTS OUTPUT
Vcc STROBE 4A 4B 4Y 3A 3B 3Y
16 15 14 13 12 11 10 9
G 4A 4B 4Y 3A 3B
S 3Y
1A 1B 1Y 2A 2B 2Y
1 2 3 4 5 6 7 8
SELECT 1A 1B 1Y 2A 2B 2Y GND
INPUTS OUTPUT INPUTS OUTPUT

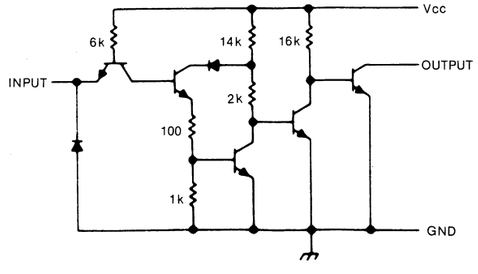
FUNCTION TABLE

INPUTS		OUTPUT
Select	Strobe G	Y
X	H	L
L	L	A
H	L	B

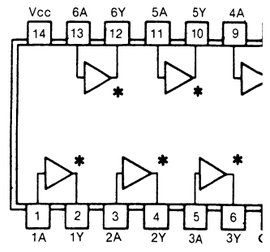


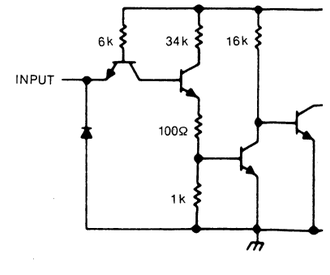
HD7406 Hex O.C. Inverters



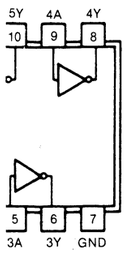


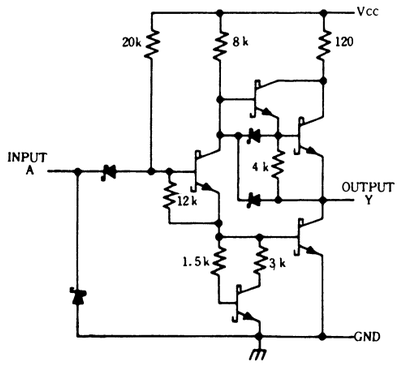
HD7407 Xex O.C. Buffe



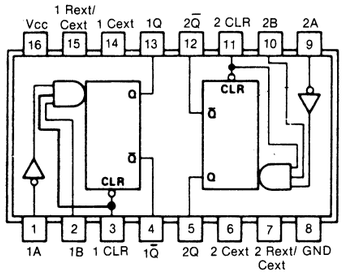


74LS04 Hex Inverters



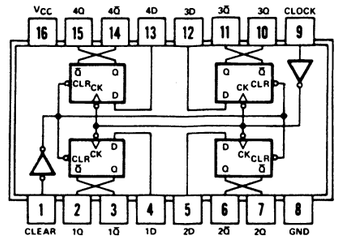


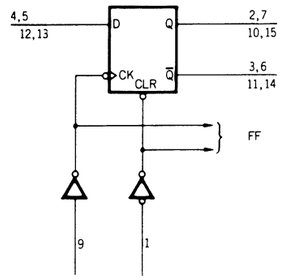
74LS123 Dual Retriggerable Single Shot



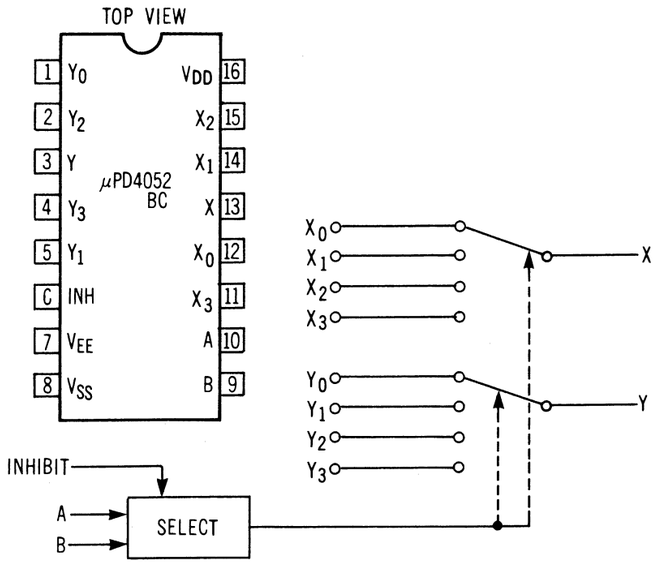
INPUTS			OUTPUTS	
CLEAR	A	B	Q	Q̄
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	⎍	⎎
H	↓	H	⎍	⎎
↑	L	H	⎍	⎎

74LS175 Quad D-FFs

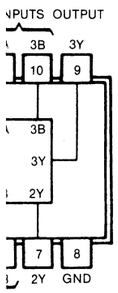




μPD4053BC Triple-2 Channel Multiplexer/Demultiplexer

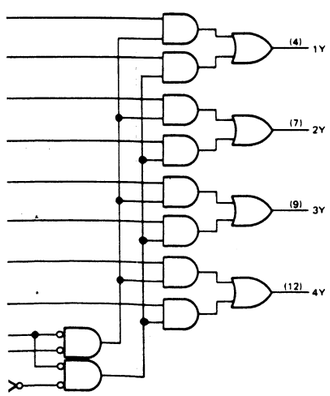


LS157 2 to 1 Data Selectors

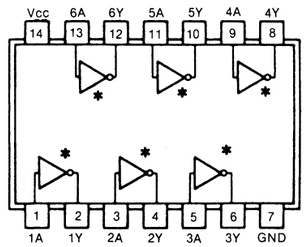


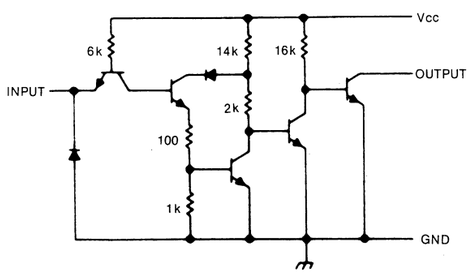
FUNCTION TABLE

INPUTS		OUTPUT
Select	Strobe G	Y
X	H	L
L	L	A
H	L	B

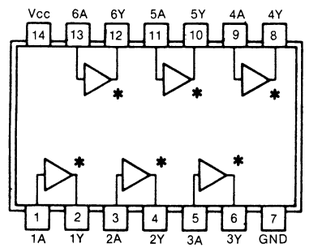


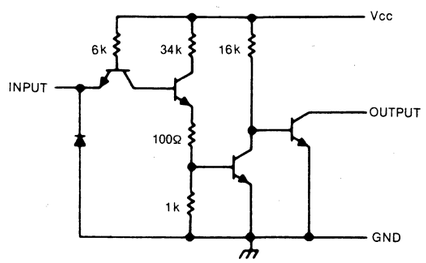
HD7406 Hex O.C. Inverters



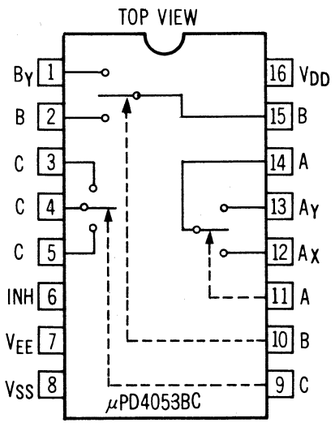


HD7407 Xex O.C. Buffers





mPD4052BC Diferential 4-Channel Multiplexer/Demultiplexer



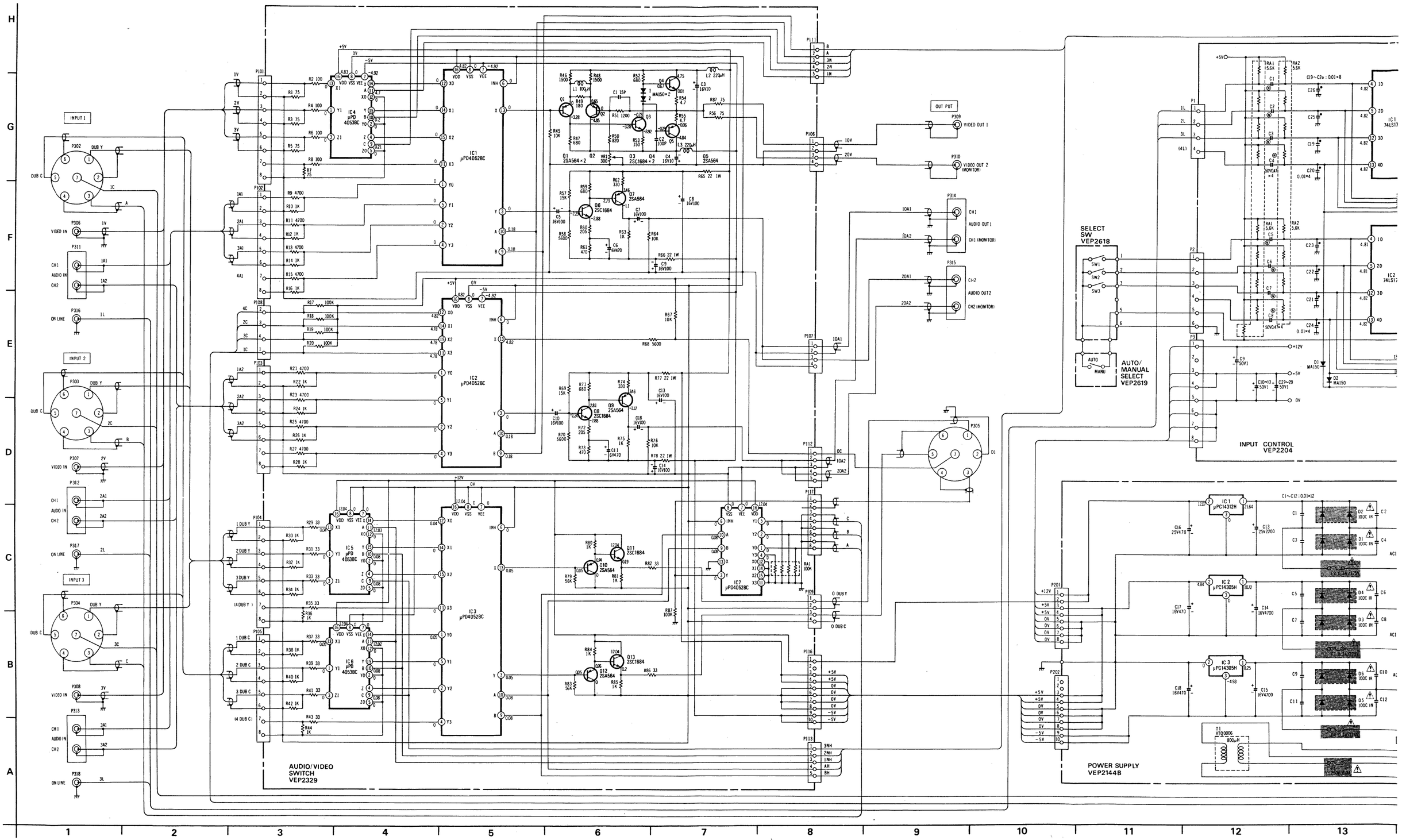
Truth Table

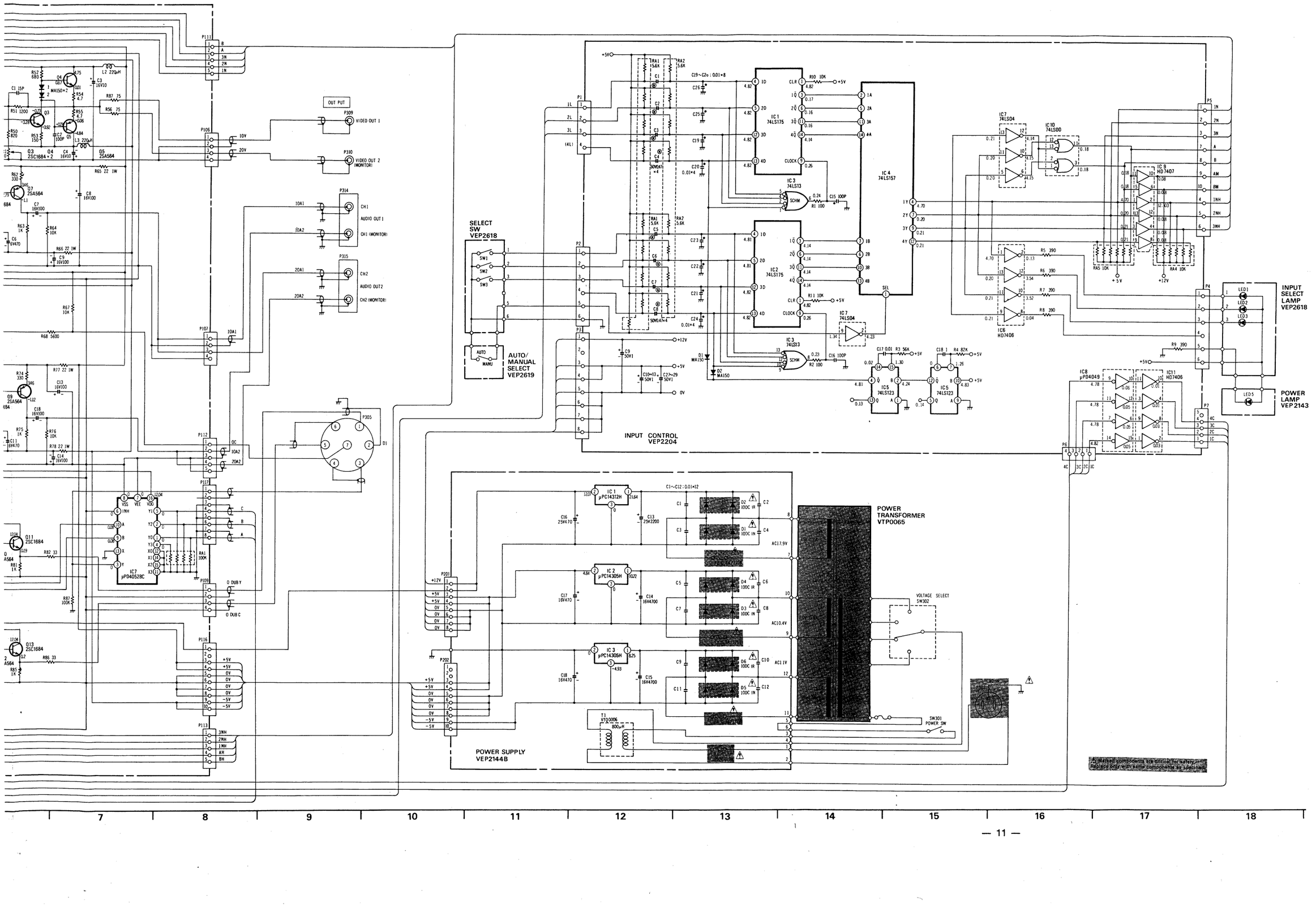
INPUT			OUTPUT	
INHIBIT	A	B	X	Y
0	0	0	X_0	Y_0
0	0	1	X_1	Y_1
0	1	0	X_2	Y_2
0	1	1	X_3	Y_3
1	X	X	NONE	

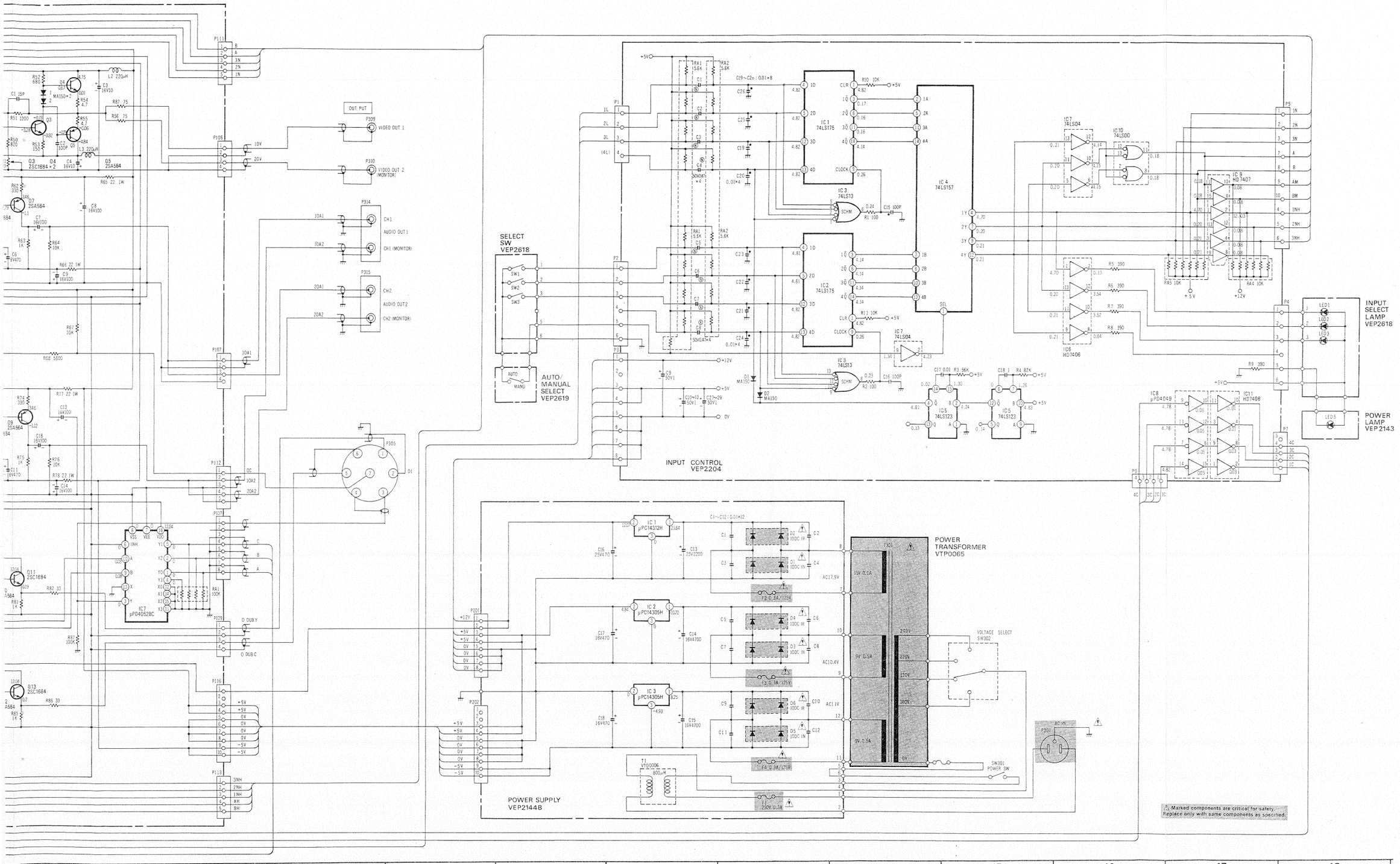
Truth Table

INPUT		OUTPUT
INHIBIT	A or B or C	A or B or C
0	0	A_X or B_X or C_X
0	0	A_Y or B_Y or C_Y
1	X	NONE

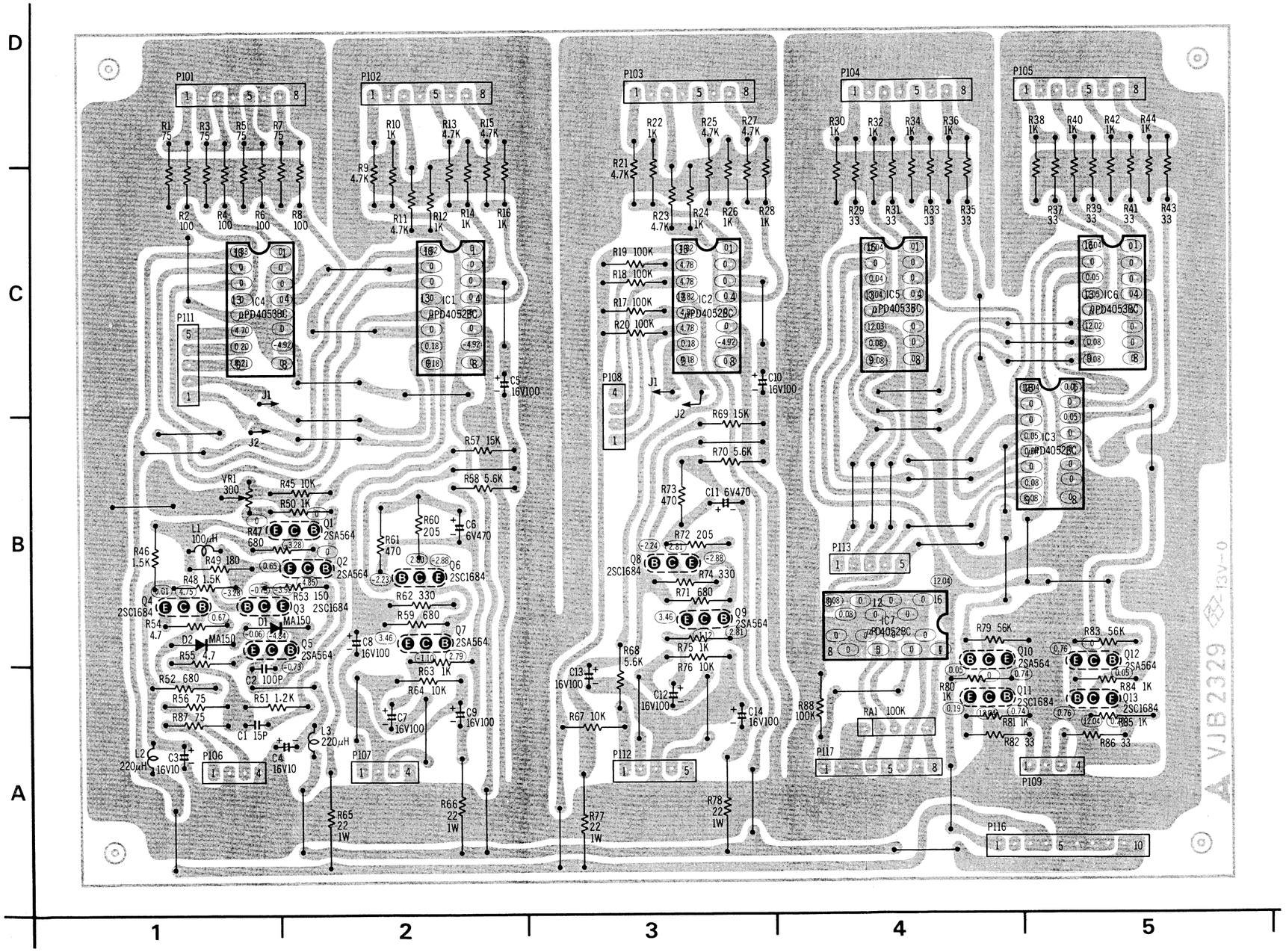
OVERALL SCHEMATIC DIAGRAM




INPUT CONTROL VEP2204
SELECT SW VEP2618
AUTO/ MANUAL SELECT VEP2619
POWER SUPPLY VEP2144B
POWER TRANSFORMER VTP0065
INPUT SELECT LAMP VEP2618
POWER LAMP VEP2143
OUT PUT
VIDEO OUT 1
VIDEO OUT 2 (MONITOR)
CH1 AUDIO OUT 1
CH1 (MONITOR)
CH2 AUDIO OUT2
CH2 (MONITOR)
VOLTAGE SELECT SW302
SW301 POWER SW
IC1 74LS175
IC2 74LS175
IC3 74LS13
IC4 74LS157
IC5 74LS123
IC6 HD7406
IC7 74LS04
IC8 μPD4049
IC9 HD7407
IC10 74LS00
IC11 HD7406
IC1 μPC14312H
IC2 μPC14305H
IC3 μPC14305H
IC7 μPD4052BC
AC17.9V
AC10.4V
AC1V
AC120V
AC240V
⚠ Marked components are critical for safety. Replace only with same components as specified.


INPUT CONTROL VEP2204
SELECT SW VEP2618
AUTO/ MANUAL SELECT VEP2619
INPUT SELECT LAMP VEP2618
POWER LAMP VEP2143
POWER SUPPLY VEP2144B
POWER TRANSFORMER VTP0065
OUT PUT
VIDEO OUT 1
VIDEO OUT 2 (MONITOR)
AUDIO OUT 1
CH1 (MONITOR)
AUDIO OUT 2
CH2 (MONITOR)
VOLTAGE SELECT SW302
SW301 POWER SW
AC IN
IC 1 74LS175
IC 2 74LS175
IC 3 74LS13
IC 4 74LS157
IC 5 74LS123
IC 6 HD7406
IC 7 74LS04
IC 8 μPD4049
IC 9 HD7407
IC 10 74LS00
IC 11 HD7406
IC 1 μPC14312H
IC 2 μPC14305H
IC 3 μPC14305H
IC 7 μPD4052BC
T1 VTP0006
F1 250V 0.3A
F2 0.3A/125V
F3 0.3A/125V
F4 0.3A/125V
⚠ Marked components are critical for safety. Replace only with same components as specified.

AUDIO & VIDEO SWITCH C.B.A (VEP2329)



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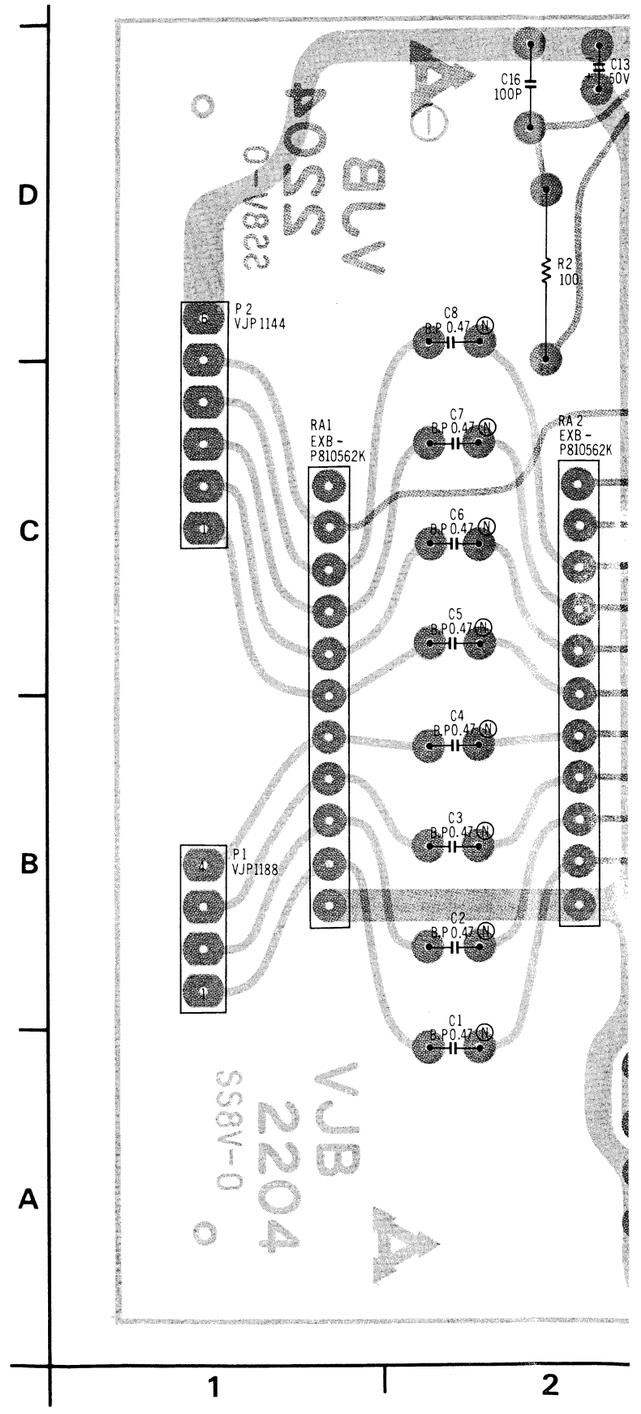
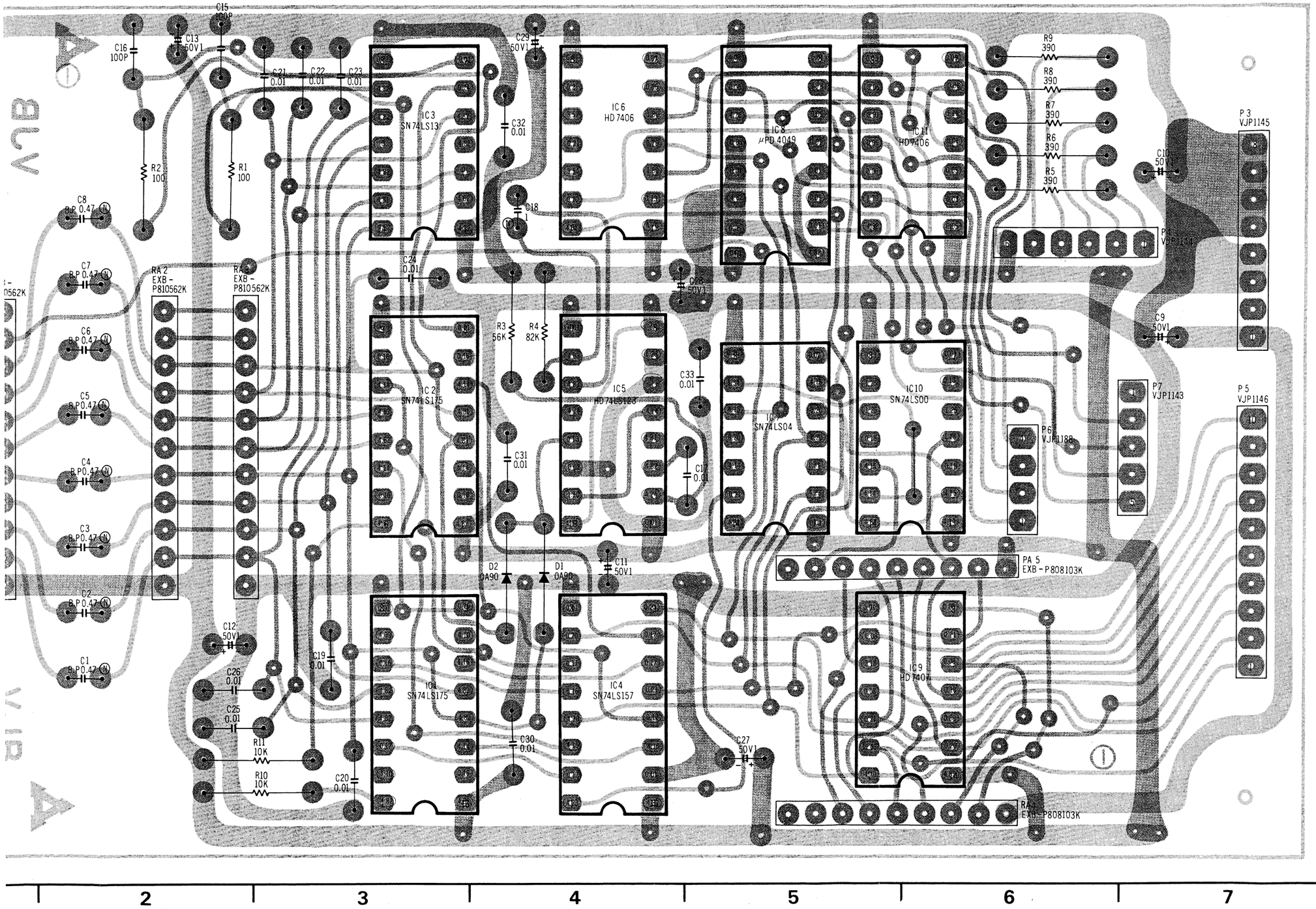
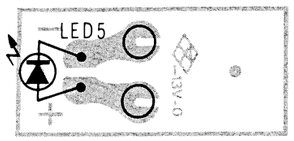
INPUT/OUTPUT CONTROL C.B.A



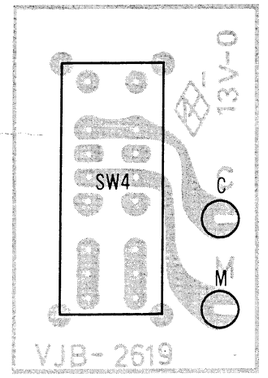
CONTROL C.B.A (VEP2204)



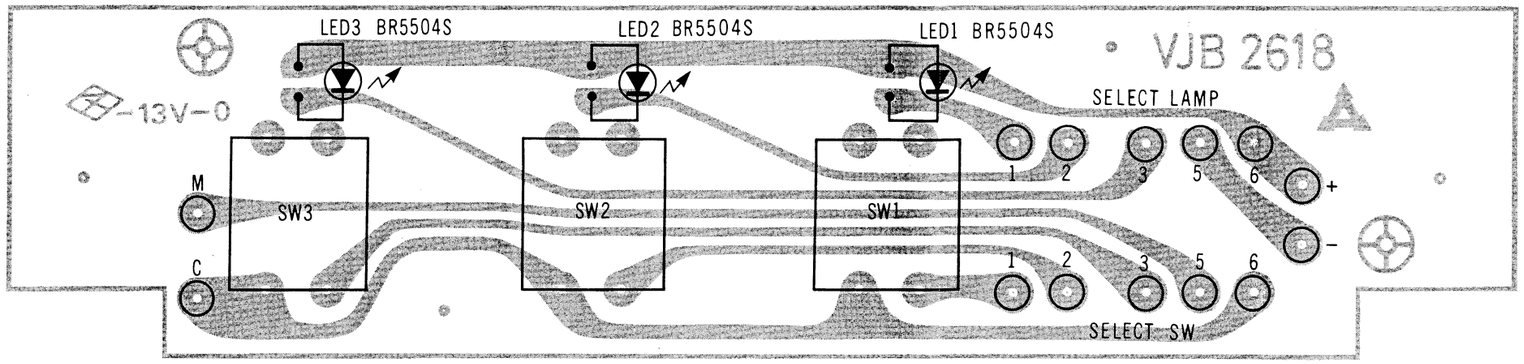
POWER LAMP C.B.A (VEP2143)



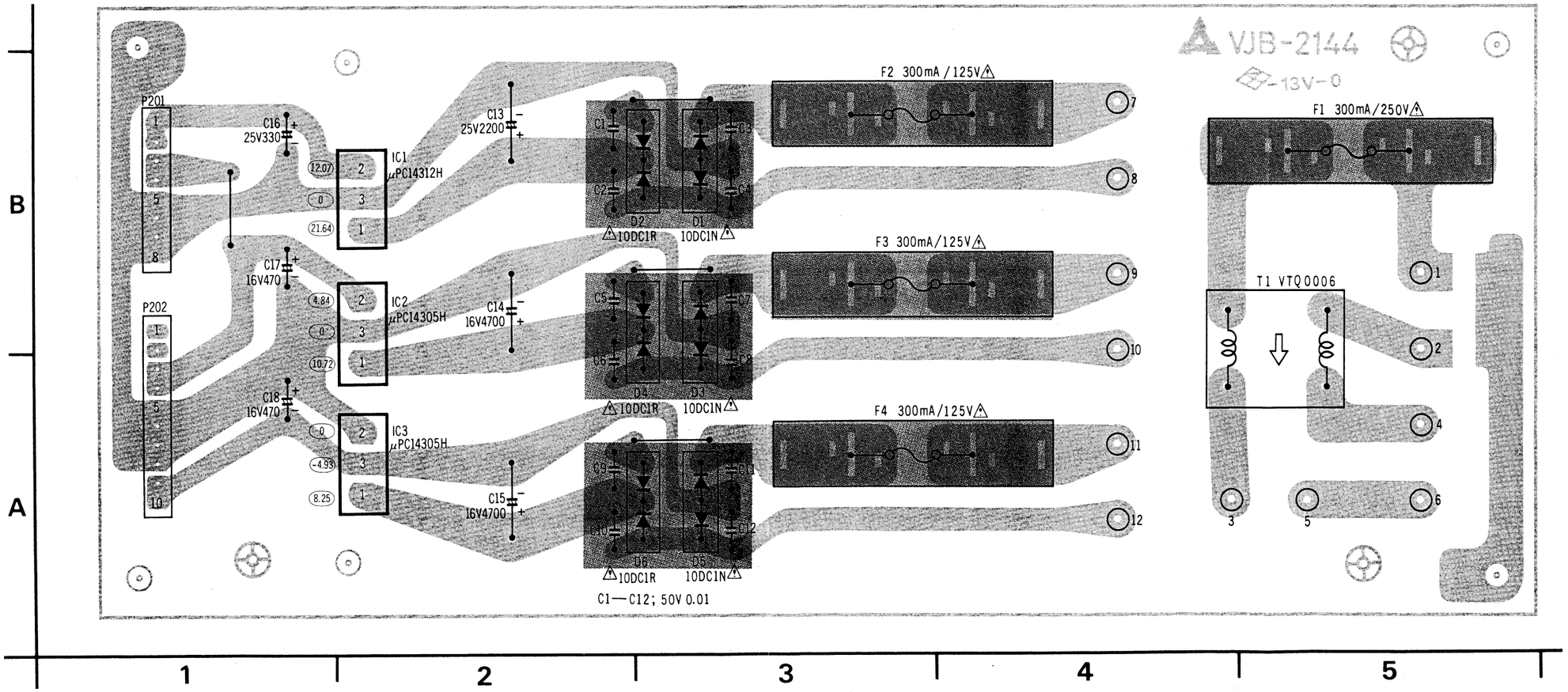
AUTO/MANUAL MODE SELECT SWITCH C.B.A (VEP2619)



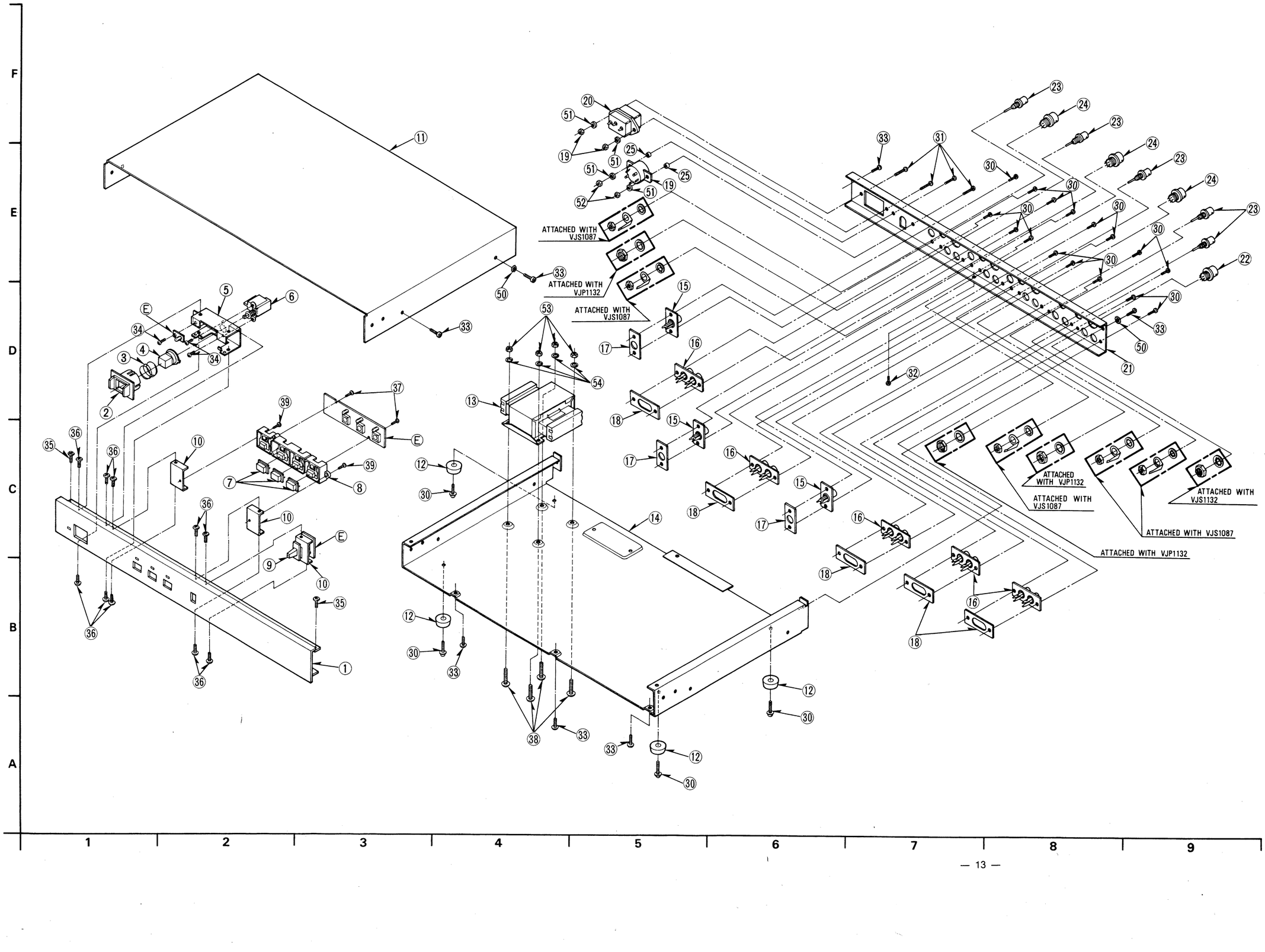
INPUT SELECT SWITCH C.B.A (VEP2618)



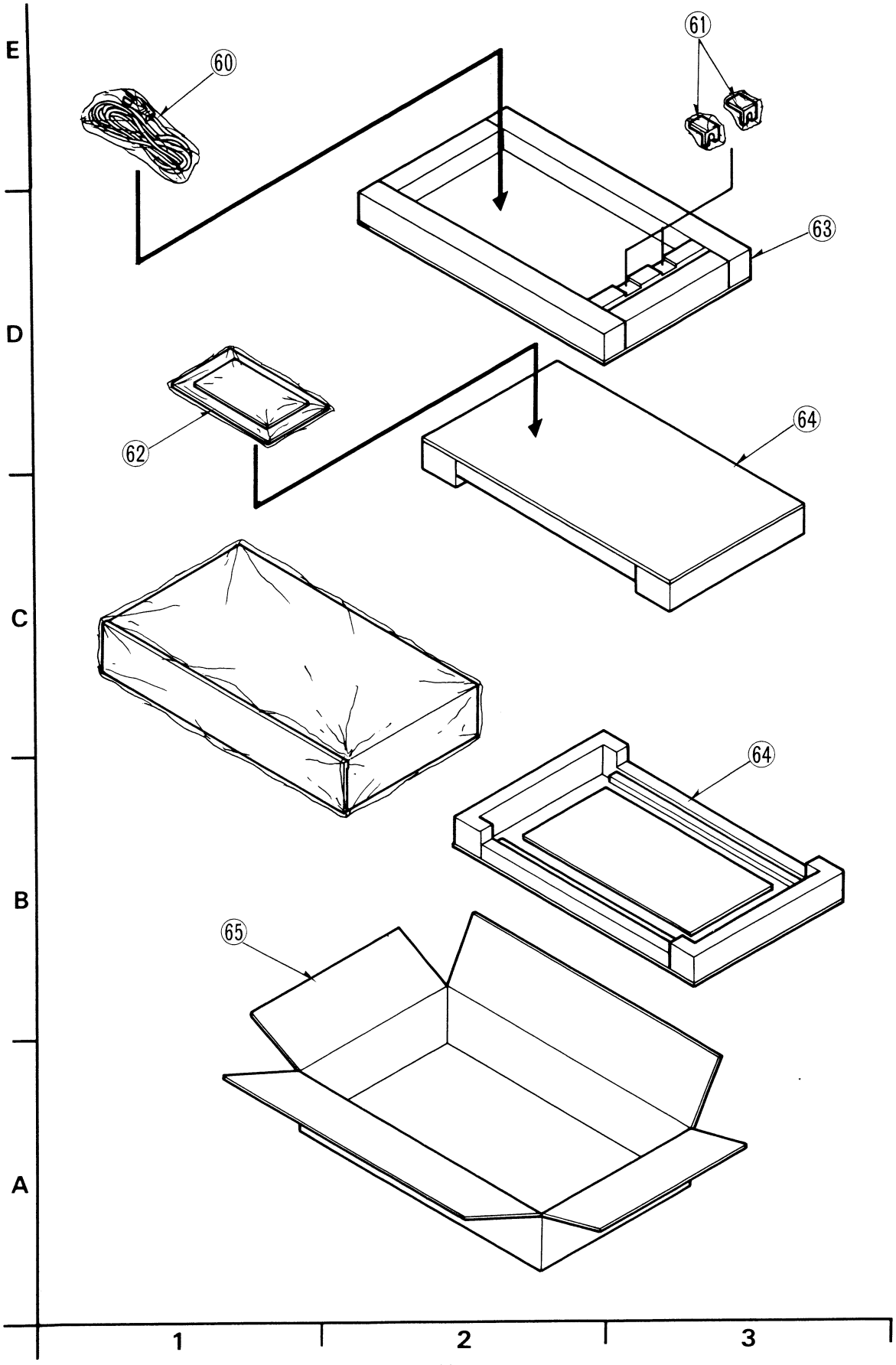
POWER SUPPLY C.B.A (VEP2144B)



EXPLODED VIEWS ❶ *Chassis & Frame Section*



❷ Packing Parts Section



MECHANICAL REPLACEMENT PARTS LIST

Model No. NV-J500

Notes:
1. * Be sure to make your orders of replacement parts according to this list.
   * "⊕" in Remarks column indicates new parts.

Item No.	Drawing No.	Description	Pcs/ Set	Availability	Part No.	Remark
1	1	Front Panel	1		VGP0543	⊖
2	1	Power Button Holder	1		VGQ0303	⊕
3	1	Button Spring	1		VMB0905	⊕
4	1	Power Button	1		VGU0272	⊖
5	1	Power Switch Angle	1		VMA5833	⊕
6	1	Power Switch	1		ESB90404T	⊕
7	1	Select Switch Button	3		VGU0329	
8	1	Select Switch Holder	1		VGK1052	⊕
9	1	Slide Switch Knob	1		VGT0229	⊖
10	1	Slide Switch Angle	3		VMA5836	⊖
11	1	Top Panel	1		VKM0140	
12	1	Rubber Foot	4		VMG0198	⊖
13	1	Power Transformer	1		VTP0065	⚠ ⊕
14	1	Bottom Plate	1		VMK0216	
15	1	1P RCA Jack	3		VJJ0018	
16	1	2P RCA Jack	5		VJJ0019	
17	1	Nut Panel (A)	3		VMA5855	⊖
18	1	Nut Panel (B)	5		VMA5856	⊕
19	1	Voltage Selector	1		ESE3767T	
20	1	AC Socket	1		VJP40	⚠
21	1	Rear Panel (B)	1		VGN1759	
22	1	7P Connector	1		VJS1132	
23	1	BNC Connector	5		VJS1087	
24	1	7P Connector	3		VJP1132	
25	1	Collar	2		VMS1644	
		Screws				
30	1		20		XSB3+8FC	
31	1		4		XSB3+15FCK	
32	1		1		XSS3+6S	
33	1		9		XSB3+6FCK	
34	1		3		XTV3+6FC	
35	1		2		XSB3+6FC	
36	1		10		XTV3+6FC	
37	1		2		XTN3+6B	
38	1		4		XSB4+8FC	
39	1		2		XSB3+8FCK	
		Washers				
50	1		3		XWC3B	
51	1		4		XWA3B	
52	1		4		XNG3E	
53	1		4		XNG4ES	
54	1		4		XWA4B	

Item No.	Drawing No.	Description	Pcs/ Set	Availability	Part No.	Remark
60	2	Power Cord	1		VJA0129	⚠
61	2	Luck Holder	2		VMA5832	⊕
62	2	Fan Bag	1		VQF0719	(USA) ⊖
	2	Fan Bag	1		VQF0720	(CANADA) ⊕
63	2	Accessory Case	1		VPN0739	
64	2	Pad	2		VPN0738	
65	2	Packing Case	1		VPG1072	(USA) ⊖
	2	Packing Case	1		VPG1073	(CANADA) ⊕

ELECTRICAL REPLACEMENT PARTS LIST

Model No. NV-J500

Note:
1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
   Components identified by shade have special characteristics important for safety. When replacing any of these components, use only the original ones.
3. Unless otherwise specified:
   All resistors are in OHMS (Ω), 1/8w, ±5% carbon, K=1,000Ω. M=1,000KΩ.
   All capacitors are in MICROFARADS (μF), ±10% P=μμF.
   All coils are in MICROHENRIES (μH), m=10^3μ.
4. C.B.A: Circuit Board Assembly.
5. C.B: Circuit Board.

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VEP2144B	Power Supply C.B.A.	1	⚠ ⑮
		VEP2329	Audio/Video Select C.B.A.	1	⑩
		VEP2204	Input Control C.B.A.	1	⑨
		VEP2618	Input Select SW C.B.A.	1	⑩
		VEP2619	Auto/Manual Select Switch	1	⑩
			C.B.A.		
		VEP2143	Power LED C.B.A.	1	⑨
		ESB90404T	Power Switch	1	⑨
		VTP0065	Power Transformer	1	⚠ ⑮
		VJP40	AC Socket	1	⚠
		VEP2329	Audio/Video Select C.B.A.		
			Integrated Circuits		
IC1-3		μPD4052BC		3	
IC4-6		μPD4053BC		3	
IC7		μPD4052BC		1	
			Transistors		
Q1,2		2SA564		2	
Q3,4		2SC1684		2	
Q5		2SA564		1	
Q6		2SC1684		1	
Q7		2SA564		1	
Q8		2SC1684		1	
Q9,10		2SA564		2	
Q11		2SC1684		1	
Q12		2SA564		1	
Q13		2SC1684		1	
			Diodes		
D1,2		MA150		2	
			Resistors		
R1		ERD25TJ750	1/4W 75	1	
R2		ERD25TJ101	1/4W 100	1	
R3		ERD25TJ750	1/4W 75	1	
R4		ERD25TJ101	1/4W 100	1	
R5		ERD25TJ750	1/4W 75	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R6		ERD25TJ101	1/4W 100	1	
R7		ERD25TJ750	1/4W 75	1	
R8		ERD25TJ101	1/4W 100	1	
R9		ERD25TJ472	1/4W 4.7K	1	
R10		ERD25TJ102	1/4W 1K	1	
R11		ERD25TJ472	1/4W 4.7K	1	
R12		ERD25TJ102	1/4W 1K	1	
R13		ERD25TJ472	1/4W 4.7K	1	
R14		ERD25TJ102	1/4W 1K	1	
R15		ERD25TJ472	1/4W 4.7K	1	
R16		ERD25TJ102	1/4W 1K	1	
R17-20		ERD25TJ10K	1/4W 100K	4	
R21		ERD25TJ472	1/4W 4.7K	1	
R22		ERD25TJ102	1/4W 1K	1	
R23		ERD25TJ472	1/4W 4.7K	1	
R24		ERD25TJ102	1/4W 1K	1	
R25		ERD25TJ472	1/4W 4.7K	1	
R26		ERD25TJ102	1/4W 1K	1	
R27		ERD25TJ472	1/4W 4.7K	1	
R28		ERD25TJ102	1/4W 1K	1	
R29		ERD25TJ330	1/4W 33	1	
R30		ERD25TJ102	1/4W 1K	1	
R31		ERD25TJ330	1/4W 33	1	
R32		ERD25TJ102	1/4W 1K	1	
R33		ERD25TJ330	1/4W 33	1	
R34		ERD25TJ102	1/4W 1K	1	
R35		ERD25TJ330	1/4W 33	1	
R36		ERD25TJ102	1/4W 1K	1	
R37		ERD25TJ330	1/4W 33	1	
R38		ERD25TJ102	1/4W 1K	1	
R39		ERD25TJ330	1/4W 33	1	
R40		ERD25TJ102	1/4W 1K	1	
R41		ERD25TJ330	1/4W 33	1	
R42		ERD25TJ102	1/4W 1K	1	
R43		ERD25TJ330	1/4W 33	1	
R44		ERD25TJ102	1/4W 1K	1	
R45		ERD25TJ103	1/4W 10K	1	
R46		ERD25TJ152	1/4W 1.5K	1	
R47		ERD25TJ681	1/4W 680	1	
R48		ERD25TJ152	1/4W 1.5K	1	
R49		ERD25TJ181	1/4W 180	1	
R50		ERD25TJ122	1/4W 1.2K	1	
R51		ERD25TJ821	1/4W 820	1	
R52		ERD25TJ681	1/4W 680	1	
R53		ERD25TJ151	1/4W 150	1	
R54,55		ERD25TJ4R7	1/4W 4.7	2	
R56		ERD25TJ750	1/4W 75	1	
R58		ERD25TJ562	1/4W 5.6K	1	
R59		ERD25TJ681	1/4W 680	1	
R60		ERO25CKF2050	Metal 205	1	
R61		ERD25TJ471	1/4W 470	1	
R62		ERD25TJ331	1/4W 330	1	
R63		ERD25TJ102	1/4W 1K	1	
R64		ERD25TJ103	1/4W 10K	1	
R65,66		ERG1ANJ220	Metal Oxide 22	2	
R67		ERD25TJ103	1/4W 10K	1	
R68		ERD25TJ562	1/4W 5.6K	1	
R69		ERD25TJ153	1/4W 15K	1	
R70		ERD25TJ562	1/4W 5.6K	1	
R71		ERD25TJ681	1/4W 680	1	
R72		ERO25CKF2050	205	1	
R73		ERD25TJ471	1/4W 470	1	
R74		ERD25TJ331	1/4W 330	1	
R75		ERD25TJ102	1/4W 1K	1	
R76		ERD25TJ103	1/4W 10K	1	
R77,78		ERG1ANJ220	Metal Oxide 22	2	
R79		ERD25TJ563	1/4W 56K	1	
R80,81		ERD25TJ102	1/4W 1K	2	
R82		ERD25TJ330	1/4W 33	1	
R83		ERD25TJ563	1/4W 56K	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R84,85	ERD25TJ102	1/4W 1K	2	
R86	ERD25TJ330	1/4W 33	1	
R87	ERD25TJ750	1/4W 75	1	
		Capacitors		
C1	ECCF1H150JC	Ceramic 50V 15P	1	
C2	ECCF1H101KC	Ceramic 50V 100P	1	
C3,4	ECEA1CS100	Electrolytic 16V 10	1	
C5	ECEA1CS101	Electrolytic 16V 100	1	
C6	ECEA0JS471	Electrolytic 6.3V 470	1	
C7-10	ECEA1CS101	Electrolytic 16V 100	4	
C11	ECEA0JS471	Electrolytic 6V 470	1	
C12-14	ECEA1CS101	Electrolytic 16V 100	3	
		Coils		
L1	VLQEL06F101	100μH	1	
L2,3	VLQEL06F221	220μH	2	
		Connectors		
P101-105	VJP1145	8P	5	
P106-109	VJP1188	4P	4	
P111-113	VJP1143	5P	3	
P116	VJP1146	10P	1	
P117	VJP1145	8P	1	
		Variable Resistor		
VR1	EVM38GA00B32	300	1	
		Resistor Array		
RA1	EXBP84104K	100K x 4	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP2204	Input Control C.B.A.		
		Integrated Circuits		
IC1,2	SN74LS175		2	
IC3	SN74LS13		1	
IC4	SN74LS157		1	
IC5	HD74LS123		1	
IC6	HD7406		1	
IC7	SN74LS04		1	
IC8	μPD4049		1	
IC9	HD7407		1	
IC10	SN74LS00		1	
IC11	HD74LS123		1	
		Diodes		
D1,2	0A90		2	
		Resistors		
R1,2	ERD25TJ101	1/4W 100	2	
R3	ERD25TJ563	1/4W 56K	1	
R4	ERD25TJ823	1/4W 82K	1	
R5-9	ERD25TJ391	1/4W 390	5	
R10,11	ERD25TJ103	1/4W 10K	2	
		Resistor Arrays		
RA1,2	EXBP810562	5.6K x 10	2	
RA4,5	EXBP88103	10K x 8	2	
		Capacitors		
C1-8	ECEA1HNR47	Non Polarity 50V 0.47	8	
C9-13	ECEA1HS010	Electrolytic 50V 10	5	
C15,16	ECKF1H101KB	Ceramic 50V 100	2	
C17	ECKF1H103ZF	Ceramic 50V 0.01	1	
C18	ECEA1HN010	Non Polarity 50V 1	1	
C19-26	ECKF1H103ZF	Ceramic 50V 0.01	8	
C27-29	ECEA1HS010	Electrolytic 50V 1	3	
		Connectors		
P1	VJP1188	4P	1	
P2	VJP1144	6P	1	
P3	VJP1145	8P	1	
P4	VJP1144	6P	1	
P5	VJP1146	10P	1	
P6	VJP1188	4P	1	
P7	VJP1143	5P	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VEP2618	Input Select SW C.B.A.		
LED1-3		BR5504S	LED	3	
			Miscellaneous		
SW1-3		EVQPXRO4K	Light Touch Switch	3	
		VJH24	GT Pin	12	
		VEP2619	Auto/Manual Select Switch C.B.A.		
SW4		ESD32167	Switch	1	
		VJH24	GT Pin	2	
		VEP2143	Power LED C.B.A.		
LED5		BR5504S	LED	1	
		VJH24	GT Pin	2	
		VEP2144B	Power Supply C.B.A.		
			Integrated Circuits		
IC1		μPC14312H	Regulator IC 12V	1	
IC2,3		μPC14305H	Regulator IC 5V	2	
			Diodes		
D1		10DC1N		1	⚠
D2		10DC1R		1	⚠
D3		10DC1N		1	⚠
D4		10DC1R		1	⚠
D5		10DC1N		1	⚠
D6		10DC1R		1	⚠
			Capacitors		
C1-12		ECKF1H103ZF	Ceramic 50V 0.01	12	
C13		ECET25R222	Electrolytic 25V 2200	1	
C14,15		ECET16R472	Electrolytic 16V 4700	2	
C16		ECEA1ES331	Electrolytic 25V 330	1	
C17,18		ECEA1CS471	Electrolytic 16V 470	2	
			Fuses		
F1		XBA2FO3NM100	300mA 250V	1	⚠
F2-4		XBA1FO3NU14A	300mA 125V	3	⚠

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Miscellaneous		
P201		VJP1145	Connector 8P	1	
P202		VJP1146	Connector 10P	1	
T1		VTQ0006	Line Filter	1	⚠
		TJC6319	Fuse Holder	6	⚠
		VSC0724	Heat Sink	1	